ISSN 1059-1249

The Magic Lantern Gazette

Volume 21, Number 1 Spring 2009

The Magic Lantern Society of
the United States and Canada

www.magiclanternsociety.org

Magic Lantern Gazette Volume 21 Number 1, Spring 2009
Issued by Kentwood Wells, Editor

Errata

After this issue was printed, I discovered two mistakes in footnotes:

Note 5 in the article on Russia is missing and should read: Yuri Tsivian, *Early Cinema in Russia and its Cultural Reception* (University of Chicago Press, Chicago, 1998), pp. 148-149.

There is a numbering error in the footnotes in Deac Rossell's article on magic lantern illustrations. Note 27 does not exist, so all notes from 28 on should be one number lower in both the text and the footnotes.

Magic Lantern Reveries in Russia

It is twilight. Reluctantly I rise from my working-frame. I cannot take any out-door exercise to close the weary day—nor can I for a moment stir from my chamber. The heavy rain falls with increased violence, and the streets stream with mud. I pass the "grey hour" of twilight in pacing the room in silent meditation. Ah, my meditations that I revolve in my solitude, they bring a whole world into my soul, calling into my presence, to this my lonely abode, glimmering with the last faint light of parting day, so many dear reminiscences, appearing for a moment, then vanishing like shadows of a **magic lantern**.

Revelations of Siberia, by a Banished Lady
(London, 1853), vol. 1, p. 274.

Will there be another year like this? Sometimes, as if in the **magic-lantern**, the pictures change; my thoughts wander off to my far away home, and I begin to converse with my dear ones; these images vanish, and again my brain is busy with the questions of the day.

Jonas Stadling and Will Reason,
In the Land of Tolstoi (New York, 1897), p. 139

This issue of the *Gazette* contains two long research articles. The cover article describes the results of some of my own research on the magic lantern in Russia, an area long neglected by magic lantern researchers. My article is by no means the last word on the subject, because I cannot read original Russian sources, but my hope is that it will be sufficiently interesting to stimulate other scholars with the necessary language skills to probe deeper into the subject.

The second feature article is a very interesting contribution by Deac Rossell, a leading magic lantern scholar, who argues that much can be learned about the history of the magic lantern by close study of early illustrations of lanterns. Rather that just being decorative or diagrammatic representations of magic lanterns, these illustrations, according to his analysis, are most likely derived from actual early models of magic lanterns. Indeed, a tiny handful of such lanterns survives to this day in various museums and private collections.

Because of the length of these two articles, a number of other articles and short pieces sent to me recently have been deferred until the Summer issue, which I hope to begin soon so that the publication schedule will catch up to the actual seasons. Of course, I am always happy to receive additional material for our journal, either long research articles or short pieces on magic lantern history or collecting.

This issue appears at an interesting turning point in the history of the projected image, with Kodak having recently announced that it will no longer produce Kodachrome film, the most successful color slide film in history. Along with the demise of the Kodak carousel slide projector a few years ago, this marks the virtual extinction of a form of image projection that has been in place since the 1600s—the projection of images from color transparencies by shining a light through the slide and magnifying it on a screen with a system of lenses. Now digital images are projected by LCD projectors from computers—no glass slide or color film transparency is needed. Perhaps this means that in the near future, when someone asks one of us, "What exactly is a magic lantern?", the usual explanation that it is the ancestor of the modern slide projector and the movie projector will no longer make sense to a younger generation. Soon the slide projector will be as unfamiliar as a rotary-dial telephone is to our children today.

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Loading supplies on a Russian ship, a slide from the set *From the Thames to Siberia*. Wells collection

The Magic Lantern in Russia

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And from the height of this perception that which formerly had tormented and interested him suddenly was illuminated by a cold white light, without shadows, without perspective, without distinction of contours. His whole life presented itself to him like a magic lantern, into which he had long looked through a glass and under artificial illumination. Now he suddenly saw these badly painted pictures without a glass, and in the bright daylight.

"Yes, yes, there they are, those false images that have agitated and delighted and vexed me," he said to himself, rummaging in his imagination through the chief pictures of his magic lantern of life, looking at them in this cold while light of day, the clear thought of death.

Leo Tolstoy, *War and Peace* (1869)

Despite many years of research by scholars and collectors, we know remarkably little about the use and culture of the magic lantern outside of Western Europe and North America. A couple of short articles in *The New Magic Lantern Journal* called attention to the lack of information on the magic lantern in Russia. The first presented a 19th century photograph of a Russian city street showing a shop selling magic lanterns and other optical goods.[1] The second was a description of a Russian-made magic lantern recently purchased on Ebay.[2] These tidbits encouraged me to seek out more information on the history of the magic lantern in Russia. There is little evidence of a 19th century export market for Russian-made lanterns and slides, so relatively few of these items have made their way into western Europe and the United States. Original Russian sources, such as magic lantern catalogs, newspapers, and magazines, are hard to find outside of Russia, and most magic lantern scholars and collectors cannot read Russian. This article is a first attempt to examine the use of the magic lantern in Russia. Historical and literary sources suggest that a thriving culture of the magic lantern existed in Russia in the 19th century, as in other European countries, with lantern slides being used for entertainment, education, and moral persuasion. This article makes no claim to being a definitive treatment of the subject; that must await the efforts of scholars who can access and read original Russian sources, which I cannot do.

Lantern slide of an unidentified 19th century street scene in a Russian city. Wells collection.

Magic Lantern Entertainments in Russia

Russian culture was unusual among European countries in the 19th century for the richness of its visual imagery, from colorfully-painted icons and advertising signs to prints, engravings, illustrated magazines, and visual entertainments such as panoramas, dioramas, peepshows, waxworks, magic lantern shows, and later, motion pictures. The importance of visual imagery in Russian culture has been attributed in part to the low literacy rate of the Russian population and a consequent lack of emphasis on written texts.[3] Catriona Kelly, in a study of Russian peep shows, mentions that magic lanterns were a familiar part of middle and upper-class homes in late 19th century Russia (the middle and upper classes being a tiny proportion of the country's population). She cites recollections of childhood magic lantern shows by prominent figures such as the artist Alexandre Benois (1870-1960) and the writer Vladimir Nabokov (1899-1977).[4] Nabokov also made use of magic lantern metaphors in his writing.[5] Anna Brodsky (1853-1929), wife of the Russian violinist Adolph Brodsky, wrote of her adolescence in the 1870s, when her sister organized Sunday lectures on literature, history, and science, illustrated by the

magic lantern.[6] Catherine Breshkovsky (1844-1934), a socialist party organizer who became known as "The Little Grandmother of the Russian Revolution," wrote in a 1911 letter, while in exile in Siberia, that she enjoyed copies of *National Geographic Magazine* sent by friends in the United States and was having a man photograph pictures from the magazine to "make them fit to be shown in the magic lantern."[7]

It is not clear exactly when magic lanterns first appeared in Russia, but it seems likely that they had been imported from Western Europe by the 18th century. Traveling showmen, including Italian Savoyards, apparently were active in Russia in the 18th and early 19th century, presenting both magic lanterns and peepshows.[8] A book of travels in Russia, originally published in 1814, mentioned magic lantern shows among other sorts of entertainment to be found at Russian carnivals: "Charlatans, or slight of hand gentry of every description, profit by the occasion, and collect round sums from the people, who feel in a humor to part with their money. Round these mountains wooden stages or booths are erected, in one of which there is an exhibition of curious animals brought from foreign countries; in another, rope-dancing; in a third, a puppet shew; in a fourth, phantasmagoria; and so on."[9]

One of the most famous of all lanternists was the Belgian showman, Etienne-Gaspard Robertson, who took his phantasmagoria show to Russia in 1803 and spent several years in the country, even presenting his show for Tsar Alexander I. Magic lantern scholars have said very little about Robertson's years in Russia.[10] However, a number of anecdotes about his sojourn in Russia can be found in an article published in 1855, largely drawn from Robertson's own memoirs, including this passage:

> The magic lantern business experienced at the outset a slight check. At Paris M. Robertson had concluded his entertainment with a homage to Napoleon. At St. Petersburg it was thought proper to put Alexander in Napoleon's place. The young Czar Alexander always wore a dark green coat, and dark green reflects so little light that it would not suit the magician's apparatus; a change was, for this reason, made in the picture to scarlet, for the sake of brilliancy. The result was a commotion among the police. The Czar shown in the colours of a Jacobin? Siberia for such a crime! The governor of the town threatened nothing less, if the offence were repeated. The exhibition was for some days closed by authority. The exhibitor was called upon to submit to the police a catalogue of all his phantoms; there being no freedom allowable in Russia even to a shadow. M. Robertson was forbidden to make profane copies of the image of a Czar again, and his ghosts were made to feel the pinch of a strict censorship.[11]

Lantern slide of the Kremlin, Moscow. Keystone View Company. Wells collection.

Entertaining the Tsars

For at least a century and a half, members of the Russian royal family were familiar with and entertained by magic lanterns. It seems quite likely that Peter the Great (reigned 1682-1725), who founded the St. Petersburg Academy of Sciences, would have included magic lanterns among the scientific instruments that he brought back from his travels in Europe, especially France and Germany.[12] The Empress Catherine the Great (reigned 1762-1796) also was familiar with magic lanterns, or at least members of her court referred to them, as in this letter from 1805: "Copenhagen, which is washed by the waves, flitted by us like a scene in a magic lantern."[13] A contemporary writer, referring to a play supposedly written by Catherine, but more likely by her chief secretary, G. R. Derzhavin, described the performance as "nothing more than a magic lantern, exhibiting different objects in succession to the eyes of the spectator: but to me such exhibitions, in which the great evens of history are introduced as in a picture on the stage, are more interesting than the strainings of the throat of our opera singers, and the amorous intrigues of our tragedies."[14] The magic-lantern-like structure of the piece is not surprising, given that Derzhavin later wrote a major poem entitled "The Magic Lantern" (see below).

Late 19th century Russian rulers also were familiar with the magic lantern. For example, in a 1915 letter, the Empress Alexandra wrote to her husband, Tsar Nicholas II, about the family's recent activities, noting that "Mr. Gillard read aloud and then showed us the magic lantern."[15] At about the

Lantern slide of the coronation of Tsar Nicholas II and Empress Alexandra, May 1896. From a silent-movie still photo, supplied to the Keystone View Company by the Photographic History Service of Hollywood, for a slide set on *Russian Life*. Scenes from the actual coronation were filmed and are some of the oldest existing motion pictures of any news event. Wells collection.

the same time, Henry C. Mahoney set off from England to Russia at the behest of a member of the Russian Royal Family: "I had spent considerable time with this scion of the Russian nobility discussing the final arrangements concerning my departure to his palace in Russia, where I was to devote two months to a special matter in which he was deeply interested, and which involved the use of special and elaborate photographic apparatus, microscopes, optical lantern and other accessories." Unfortunately, Mr. Mahoney chose to travel through Germany, where he was promptly arrested as a spy and spent nearly a year and a half in various prisons.[16] In 1913, as part of the celebration of the Tercentennial of the founding of the Romanov Dynasty, public festivals were organized that included such entertainments as plays, panoramas, and magic lantern shows on the history of the Romanovs.[17]

Tsar Nicholas II was responsible for the most important photographic lantern slide project ever undertaken in Russia. In the early 1900s, the chemist and pioneering photographer Sergei Mikhailovich Prokudin-Gorskii developed a way of producing natural color photographs that resemble modern Kodachrome slides in their realism. The technique involved making three separate negatives of the same scene, each taken through a different color filter. Using a specially designed lantern, the positive images produced from these negatives could be projected on a screen and, with the use of color filters, combined into a single color image on the screen. In an era of hand-tinted lantern slides, the images produced were extraordinary, and the Tsar commissioned Prokudin-Gorskii to travel throughout the empire, making a color photographic record of imperial Russia. Most of the images were of buildings and landscapes, or posed portraits of people, because each image had to be taken three times and would have been distorted by any movement between exposures. Many of Prokudin-Gorskii's original glass plates are now in the collection of the Library of Congress, and digitally-processed reproductions of his color pictures can be viewed on the library's website (http://www.loc.gov/exhibits/empire/). This spectacular color record of Russia before the Revolution also was published in a book, *Photographs for the Tsar*, in 1980.[18]

A poignant epilogue to the royal family's connection to the magic lantern comes from the list of their possessions found in Yekaterinburg, where the Tsar and his family spent their final days before being executed by the Bolsheviks. Among the items found among the debris of Popov House was "a cardboard box with ten glass magic lantern slides," and an additional 22 magic lantern slides were found in the home of one of the Tsar's guards.[19]

Education, Public Lectures, and Public Morality

The Educational Exhibit of the Russian Empire at the Centennial Exhibition in Philadelphia in 1876 was a revelation to many visitors. Russia was widely viewed at this time in both Europe and North America as a backward country largely populated by illiterate peasants, and in fact, much of the Russian population was illiterate. It therefore came as a surprise that Russia's educational exhibit at the Centennial was one of the most impressive of any country. This was largely due to the efforts of Tsar Alexander II, whose reign (1855-1881) was the most progressive of the Romanov Dynasty. After the disastrous results of the Crimean War (1853-1856), it became clear that Russia was educationally and technologically backward compared to the major European powers and could no longer rely on a military populated by illiterate serfs led by an officer corps that was only slightly better educated. Alexander not only abolished the feudal serf system, but he also initiated major reforms to improve public education for both the military and for civilians. In 1864, the Russian government founded a museum and depository for educational materials and apparatus in St. Petersburg, originally for the benefit of the military, but eventually extended to a broader educational mission. This evolved into a major Pedagogical Museum, a section of the Grand Museum of Practical Science. This museum, the largest educational museum in the world at the time, is what enabled the Russian government to put on such an impressive display at the Centennial Exhibition. Within this museum was an optical and photographic department, which produced magic lanterns and slides for use in educational institutions throughout Russia. By 1876, the museum held a collection of 4000 magic lantern slides, "arranged to illustrate various branches of knowledge," some of which were on display at the Centennial Exhibition.[20]

Lantern slide of peasants in a Russian village, late 19th century. Wells collection.

By the late 19th century, the use of photographic magic lantern slides had become a standard part of educational practice throughout Russia, not only in major cities such as Moscow and St. Petersburg, but also in remote villages and the distant reaches of Siberia. Samuel Turner, traveling through Siberia in 1903, wrote, "On our way to the town we passed through a village which has sprung up quite recently near the station. It contains a parish school of brick, in which a lecture illustrated by a magic-lantern is occasionally given."[21] In a book originally published in 1901, Francis H. E. Palmer described efforts to improve the education of Russian soldiers and working class civilians:

> The number of schools and evening classes for adults is now being greatly increased, for the benefit not only of soldiers but of the working classes generally. In these schools lectures are given on instructive subjects, illustrated by the magic lantern; and so greatly has the system developed of late that a special department has recently been opened in St. Petersburg, where the slides are made in immense numbers and distributed all over the Empire. One highly important section of this department manufactures slides which illustrate improvement in a great number of cooperative trades carried on by the peasants themselves. Aided by these and the explanatory lectures, many a young soldier, instead of forgetting his village industry, returns home with his mind stored with new ideas for its development. These classes are held in nearly all the garrison towns in the Empire, informal examinations are made from time to time, and prizes of trifling value, but highly esteemed by the men, are given to those who have followed the lectures intelligently. Their success has lead many of the *Zemstva* and municipal councils to establish similar classes in most of the larger towns for the benefit of the civilian peasantry who flock into the manufacturing districts during the winter months.[22]

The use of magic lanterns extended to other forms of adult education and entertainment as well. In an account of travel aboard a Russian ship in 1880, Henry Lansdell reported on methods used by the captain to entertain the sailors: "On another occasion the captain paid some Chinese jugglers to come on board and give the men an exhibition, whilst, in the tropics, the officers had given the men lectures on scientific subjects, illustrated by a magic lantern."[23]

Early in the Soviet era, the Y.M.C.A. launched an educational mission, under the direction of C. C. Hatfield, known as the Volga Expedition. This consisted of a series of lectures and exhibitions on subjects such as agricultural science, hygiene, and household arts presented in villages along the upper Volga River on a steamboat provided by the Soviet government. One part of the ship was made into a lecture room that could accommodate up to 200 people. The room was "well equipped with an up-to-date moving picture machine and stereopticon. Fortunately, a number of reasonably good reels of Russian agricultural subjects were secured and also a fairly good selection of slides. Only a limited number of American films and slides were available."[24]

An English writer, Bernard Pares, described the use of magic lanterns in Russian churches and factories. Describing the activities of one priest in a small village, he wrote, "In winter he reads to his flock in the church or elsewhere, most often the Gospel... He uses a magic lantern."[25] The same writer described efforts to entertain and educate factory workers: "Every Sunday throughout the winter, priests or factory clerks give free magic lantern lectures to the workmen and their families; the subjects are generally of a moral character, but the management sometimes chooses a subject of present-day interest, say, for instance, 'Life in Japan.'"[26]

Magic lanterns even found their way into Russian prisons, where they were used to entertain prisoners with an eye toward improving their behavior. One traveler who investigated conditions among prisoners sent to Sakhalin Island reported that, "The change in the conduct of these ex-convicts has been very remarkable. Men who were brutes, murdering for the sake of a few kopyeks, whom nothing, not even the lash, would subdue, gather on holidays in the Sister's room to listen to the singing, recitation, the gramophone, and to watch the magic-lantern slides, which friends in Russia have now sent to them."[27] Father George Gapon, who ministered to prisoners headed for exile in Siberia, also used the magic lantern:

Lantern slide of women in a Russian prison, from the New York stage production of Leo Tolstoy's *Resurrection* (1903). Photograph by Joseph Byron. Wells collection.

"The former chaplain of the prison had arranged meetings of the prisoners of a religious character, but without much success. I continued and extended this work, giving the prisoners an opportunity of discussing some of the questions raised, and introduced a magic lantern to give an added interest. A magic lantern in a Russian prison! the reader may exclaim with astonishment. But indeed, there are kind-hearted men even among the Tsar's gaolers... The prisoners became immensely interested in our readings and discussions."[28] In the most remote parts of Russia, a prison sometimes served as an auditorium for magic lantern shows, simply because it was the largest venue in town. The Russian newspaper *Novoe Vremya*, commenting on the lack of intellectual life in remote Russian villages, stated: "No libraries, no theatres, no reading-halls! And if on the initiative of a teacher or other intellectual leader a lecture is given, with or without a magic lantern, it takes place in the roomiest building on the town, namely, the jail. Such a lecture is considered a great social event, and the local paper devotes columns to it."[29]

As in Western Europe and North America, the magic lantern often was used not only for entertainment and education, but as an instrument to improve public morality and social control. These issues became particularly acute in Russia in the second half of the 19th century, as millions of newly-freed serfs flocked to the cities to find work in factories. This resulted in a dramatic increase in social problems, such as public drunkenness and crime. Despite educational reforms initiated in the 1860s, as late as 1897, half of the factory workers in Russia were illiterate.[30] Consequently, the government, factory owners, the church, and social reformers all searched for ways to keep this large and poorly educated workforce entertained and under control. Magic lantern shows and public lectures illustrated with lantern slides, directed toward working class audiences, were common. Some of these were sponsored by factory owners, with exhibitions taking place in the factories and even in unusual venues such as slaughterhouses.[31]

Other magic lantern shows were sponsored by Guardianships of Public Sobriety, government-sponsored organizations that did not attempt to ban alcohol, which was sold mostly by the government, but simply tried to reduce its consumption by giving workers something else to do. According to one estimate, by 1908, more than 490,000 people in St. Petersburg had attended 1,854 illustrated lectures on alcoholism.[32] Nevertheless, lantern slide shows and public lectures were considerably less popular than live theater performances, and the late 19th and early 20th centuries saw the growth of a huge "People's Theater" movement, also sponsored by the Guardianships. From 1898 to 1914, some 74 million people attended more than 9600 theater performances.[33] From the 1870s onward, Russian authorities also instituted a huge program of public readings to expose working class audiences to "uplifting" literature. In the early years, these readings often were accompanied by magic lantern slides, but later, the focus shifted to the written material itself. These public readings never came close to the popularity of live theater performances, although at least some people apparently were tempted to attend because they thought "they could see a magic lantern show."[34]

Lantern slide of a Russian family, late 19th century. The original is hand-colored. Wells collection.

The Magic Lantern in Russian Literature

One of the best indicators of public familiarity with the magic lantern in 19th century Russia is the widespread occurrence of references to magic lanterns, the use of magic lantern metaphors, and a "magic lantern style" of writing in Russian literature. The first magazine in Russia to be illustrated with color plates, which appeared at the beginning of the 19th century, was called *Magic Lantern* (*Vol'shebnyi fonar*). This publication presented a gallery of small, colorful prints of individuals interacting on the streets of St. Petersburg, such as an exchange between a coachman and a pancake vendor. These prints became extremely popular and formed the basis for an entire industry that produced porcelain figurines modeled after the prints.[35]

Nineteenth century Russian literature is bookended by two poetic works relating to the magic lantern. The first is "The Magic Lantern" by G. R. Derzhavin, written in 1803, which has been credited with setting the paradigm for the magic lantern metaphor in Russian literature. Almost exactly a century later, the 19-year-old poet Marina Tsvetaeva published a book of poetry, also entitled *The Magic Lantern* (1912), which employs a similar metaphor of changing magic lantern images.[36]

Derzhavin's poem is particularly interesting, because it indicates that educated Russians were familiar with the magic lantern very early in the 19th century. It includes a color illustration on the first page of a French-style magic lantern projecting the image of a lion on a sheet. The poem begins by describing a traveling magic lantern show, with each section describing a different scene being projected. The first two stanzas are given below:

The thunder of an organ's pipes
Cuts through the peace of darkened field:
A luminous, enchanting lamp
Paints on the wall a brilliant orb,
And motley shadows move therein.
The wise and wonder-working image,
With gestures and his staff, his eyes,
Creates—and then destroys them all.
Apace the townsmen gather round
To see these marvels at his hands.

Appear!
And there came forth....
The wild cave's monstrous denizen,
Emerging from its horrid shade
A lion comes.
He stands and with his paw he grooms
His gleaming mane. His tail he lashes
And his roar,
His gaze, like gales from mirky depths,
Or like a living lightning bolt
That flashes through the forest, rumbles.
He roots and pounces, seeking prey,
And, through the trees,
He spies a peaceful grazing lamb:
His leap is made—his jaws agape...
No more! No more.

Successive stanzas begin and end the same way, with a new picture appearing as the old one fades away, the replacement of one magic lantern slide with another. Finally, it becomes clear that the lantern showman is God, with all Earth's creatures being His dreams:

Is not this world a magic play,
Wherein the lantern shadows change,
Enchanting and deceiving men?
Does not some lord or sorcerer
Or mighty mage divert himself
Thereby, his prowess vaunting,
As he with idle finger sets
The planets' course? Does he not call
All earthly creatures to behold
His dreams—and they but dreams themselves?[37]

Gavrila Romanovitch Derzhavin (1743-1816)

Later Russian authors also referred to the magic lantern, often using it as a metaphor for a fleeting image, a changing scene, or a dream. Alexander Pushkin (1799-1837), writing in the early part of the 19th century, used such metaphors in his writing. One such passage occurs in his mock-epic poem, "The Gavriliad," describing an encounter between the Angel Gabriel and Mary, in the form of Mary's dream. A rhyming translation is given below:

His plumed helmet, his rich garb of fashion,
His azure wings and golden ringlets' blaze,
A figure tall, a look so unpresuming.
All this she liked, herself so unassuming.
So he alone from all of Heaven's crowd
Has pleased her—Angel Gabriel, be proud!
But now he's gone—the scene has vanished—
So pictures disappear when they are banished,
Extinguished on a magic lantern screen.

So Mary woke from sleep: a dream she'd seen,
But dallied yet awhile before it vanished.
For strange that dream, and to sweet Gabriel
Her mind was loath to bid a sad farewell.[38]

Another translator has rendered Pushkin's poem in free verse, but still with the magic lantern metaphor intact:

His superb raffish garb, the plumèd helmet.
His locks as golden as the shining wings,
His tall and languid stance, the bashful look—
All was to her taste. The warlike angel
Moved her, alone of all the multitude.
Gabriel, be proud!—The scene dissolved; like shadows
Born in a magic lantern, vanishing
Despite the children's pleas. Dominions, thrones,
Archangels, the cloud-clapped towers—all dissolved.

At dawn the lovely girl awoke, and nestled
Deeper into the languid warmth. Her dream,
And Gabriel, would not go from her mind.[39]

The magic lantern dream metaphor also appears in Pushkin's poem "Epistle for Yudin" (1815):

But the swift apparitions
Engendered in a magic lantern
Flash across the white screen;
Dreams come over me and disappear
Like shadows at dawn.[40]

A later writer who was influenced by Pushkin was Henry Von Heiseler (1875-1928), a member of a German family that had lived in Russia for generations.[41] Von Heiseler wrote a fairy-tale play in verse entitled *Die magische Laterne* (1919). Although actually a German work, the story and its sources are thoroughly Russian, so it seems appropriate to include a discussion of it here. The theme of the magic lantern is an interesting anachronism, because the play is set during the time of Ivan the Terrible, whose reign (1533-1584) was 100 years before the invention of the magic lantern! Nevertheless, it is clear that a magic lantern show is a central part of the play.[42]

Alexander Pushkin (1799-1837)

In Act 3 of the play, one of the Tsar's noblemen announces that the English ambassador wishes to ask a favor.

"Call him to me," the Tsar says. "Do you know why he has come? Is it politics?"

The nobleman replies that he has come "to show you the magic lantern, of which he spoke yesterday."

Act 4 begins with a description of the scene: *The same room. In the right rear corner, a little bit from the center, stands a large frame on which has been stretched a white cloth. Low seats, stools, and pillows are distributed about the room. To the left in front is placed the magic lantern, to be operated by Secretary William and a servant. Over on the left, music is playing.*

After some conversation among the people in the room, the stage directions state: *The room becomes dark. A servant stands by the lantern; William, a white stick in his hand, stands next to the screen. The others take their seats.*

The Tsar says, "Now everyone sit down anywhere, so the play can begin. What sort of new play is this, Sir Bowes?"

The ambassador, Sir Bowes, replies: "It doesn't have a name. When we show it to you, we will call it 'Morality in Pictures,' esteemed Sir."

The show then begins: *On the screen appears an oak tree on the shore of a lake. On the tree hangs a golden chain, on which a black cat is sitting.*

William describes the scene on the slide: As the cat swings on the golden chain, it sings when it moves to the right, and tells a fairytale when it moves to the left [this passage comes from the introduction to Pushkin's epic poem *Ruslan and Ludmilla*]. The picture on the screen changes several times. A picture of Adam and Eve appears, and later a picture of Abraham the Patriarch, counting his flocks.

William describes the scene: "See here in the picture the guardian of his flock, the great man and shepherd, Abraham, the original Authority, the model of the King."

Ivan says, "Sir Bowes, your speech means much to me," to which Sir Bowes replies, "A great prince greets a great prince."

The picture changes again, this time showing Abraham and Hagar [the second wife of Abraham], and later, another picture shows Hagar with her young son Ismael at her breast. The Tsar says "Leave this picture up," and then asks a young girl, Axínja, "Is this not a bit like you?" The princess sighs and says, "She is prettier."

At one point in the show, members of the audience begin talking among themselves, and the Tsar says, "Quiet everyone! Quiet. Sir Bowes, the next picture!" The picture changes, and on the screen is shown a picture of Job, who is ill. "A sick man!" the Tsar exclaims. "Who shows me this? A sick man! Away with this picture!"

Sir Bowes protests, "It was a religious picture..."

The Tsar becomes angry: "Leave. You torture me. Leave me. You there, why do you stare at me? Go to Hell!"

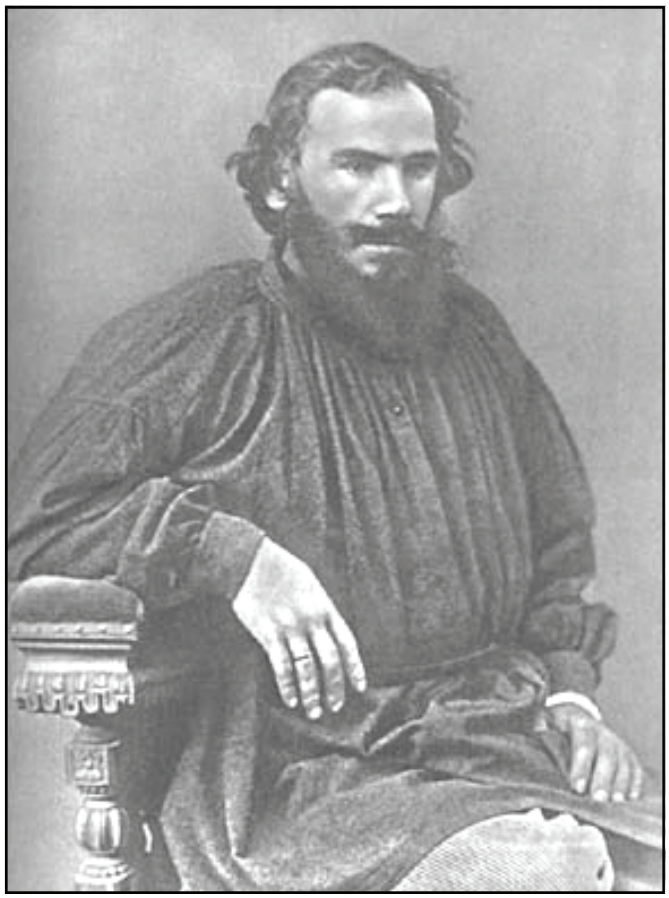
Eventually the Tsar calms down, and says, "Don't look at me, Sir Bowes, and do not torture me. You are my friend, I believe. Give me your hand. This picture of ugliness upset me—and all the others—leave me alone now—I will act as a sick man and rest awhile in my chair."

A British view of Russia, from a lantern slide set entitled *From the Thames to Siberia*. Wells collection. ►

References to the use of magic lanterns, magic lantern metaphors, or a magic-lantern-like style of writing, turn up in the works of many Russian writers of the 19th century. In "A Doctor's Visit" (1898), a short story by Anton Chekhov (1860-1904), a character describes the use of magic lantern shows in factories: "Our workpeople are very contented. We have performances at the factory every winter...They have lectures with a magic lantern, a splendid tea-room, and everything they want."[43]

A literary critic, writing in 1916, referred to a magic-lantern style of writing in Nikolai Gogol's *Dead Souls* (1842): "The author passes through his magic lantern, and shows us in all its phases, a comical creature, now laughable, now pitiable, careless, without resource, condemned to a shadowy existence."[44] The same critic said of the writings of Ivan Turgenieff (1818-1883): "His is no magic lantern; he shows real life." Another critic, describing Turgenieff's novel, *Smoke*, wrote that "In Russia, he maintains, everything is smoke and vapor, nothing else. Everything is constantly changing; new dissolving views are constantly presented; one manifestation follows the other; but, in reality, everything remains exactly as it has always been."[45]

The two greatest Russian novelists of the 19th century, Leo Tolstoy (1828-1910) and Fyodor Dostoyevsky (1821-1881) both are notable for their highly visual styles of writing, both often making use of optical tropes, including references to magic lanterns, peep shows, and other optical devices.[46] One critic, referring to the passage from Tolstoy's *War and Peace* quoted at the beginning of this article, contrasted the magic lantern metaphors of the two authors: "Thus for Tolstoi the light of death is thrown on life from without, separating and dulling the colors and shapes of life. To Dostoïevski the revealing light comes from within. The light of death and that of life are in his eyes a single fire, lit within the magic lantern of phenomena."[47]



Leo Tolstoy in 1868, at the time of the publication of *War and Peace.*

Tolstoy, perhaps the most visual of all Russian writers, made frequent references to the magic lantern, the camera obscura, peep shows, mirrors, and other optical devices, most notably in the passage quoted at the beginning of this article describing Prince Andre "rummaging in his imagination through the chief pictures of his magic lantern of life."[48] Tolstoy also referred to magic lanterns in some of his non-fiction writings and literary criticism. In an editorial about the need for land reform, he criticized land owners for superficial attempts to placate the peasants: "The more sensitive land-owners, feeling their guilt, endeavor to redeem it by renting their land to the peasants on more lenient conditions, by arranging schools for the people, ridiculous houses of recreation, magic-lantern lectures, and theaters."[49] In another article, he wrote, "What is more powerful, that enlightenment which is disseminated among the masses by the giving of public lectures, and by museums, or that savagery which is supported and disseminated among the masses by the spectacle of such holidays as that of the 12th of January, which is celebrated by the most enlightened men of Russia?...It is time to understand that the enlightenment is disseminated, not only by magic lantern and other pictures, not only by the oral and the printed word, but by the striking example of the whole life of people, and that an enlightenment which is not based on the moral life has never been and never will be an enlightenment, but only an eclipse and a corruption."[50]

In a critical essay on the writings of Shakespeare, Tolstoy again invoked the magic lantern: "An artistic, poetic work, particularly a drama, must first of all excite in the reader or spectator the illusion that whatever the person represented is living through, or experiencing, is lived through or experience by himself.... Without putting an end to the illusion, one may leave much unsaid—the reader or spectator will himself fill this up, and sometimes, owing to this, his illusion is even increased, but to say what is superfluous is the same as to overthrow a statue composed of separate pieces and thereby scatter them, or to take away the lamp from a magic lantern: the attention of the reader or spectator is distracted...."[51]

Clearly a more thorough study is needed of magic lantern references in the works of Tolstoy and other writers, by a scholar familiar with the original Russian texts.[52]

Lantern slides of a Russian man and a Russian woman, late 19th century. Wells collection.

Notes and References

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3. Catriona Kelly, Territories of the eye: the Russian peep show (*Raek*) and pre-Revolutionary visual culture, *Journal of Popular Culture*, vol. 31 (1998), pp. 49-74.

4. Kelly, Territories of the eye, p. 56.

6. Anna Brodsky, *Recollection of a Russian Home* (Sherratt & Hughes, Manchester and London, 1904), pp. 66-67.

7. Alice Stone Blackwell, ed., *The Little Grandmother of the Russian Revolution. Reminiscences and Letters of Catherine Breshkovsky* (Little, Brown, & Co., Boston, 1918), p. 207.

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14. *Secret Memoirs of the Court of Petersburg: Particularly Towards the End of the Reign of Catherine II and the Commencement of That of Paul I. Serving as a Supplement to The Life of Catherine II.* Translated from the French. T. N. Longman and O. Rees, London, 1801), p. 75.

15. Letter from Alexandra to her husband, Czar Nicholas (http://www.alexanderpalace.org/letterstsaritsa/august15.html). This letter also is included in numerous books of letters of the royal family.

16. Henry C. Mahoney, with the collaboration of Frederick A. Talbot, *Sixteen Months in Four German Prisons* (Robert M. McBride & Co., New York, 1917), p. 11.

17. Richard S. Wortman, *Scenarios of Power. Myth and Ceremony in Russian Monarchy* (Princeton University Press, Princeton, New Jersey, 2000), vol. 2, pp. 465-466.

18. Robert H. Allshouse, ed., *Photographs for the Tsar. The Pioneering Color Photography of Sergei Mikhailovich Prokudin-Gorskii Commissioned by Tsar Nicholas II* (Sidgwick & Jackson, London, 1980).

19. See webpage entitled "Alexander Palace Time Machine" (http://www.alexanderpalace.org/palace/yelist.html).

20. In the 1860s, at the time the serfs were freed by Alexander II, about 94% of the Russian population was illiterate, but literacy rates were higher in the large cities. Even by 1897, after more than 30 years of educational reforms, only 50% of all factory workers were literate, and for female workers, the rate was much lower, about 21% [E. Anthony Swift, *Popular Theater and Society in Tsarist Russia* (University of California Press, Berkeley, 2002), pp. 42-43, 132, 206]. Information on the Russian educational exhibit at the Centennial Exhibition and the Pedagogical Museum in St. Petersburg comes from: *Official Catalogue of the International Exhibition of 1876* (Dept. III.—Education and Science, Russia), p. 373; Francis A. Walker, ed., *International Exhibition, 1876. Reports and Awards Group XXVII* (J. B. Lippincott, Philadelphia, 1878), p. 164; J. George Hodgins, *Special Report to the Honourable the Minister of Education on the Ontario Educational Exhibit, and the Educational Features of the International Exhibition at Philadelphia, 1876* (Hunter, Rose, & Co., Toronto), pp. 63-66; *The Pennsylvania School Journal*, vol. 25 (1876), pp. 274-276 (the number of lantern slides in the collection of the Pedagogical Museum is given on p. 275).

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22. Francis H. E. Palmer, *Russian Life in Town and Country* (G. P. Putnam's Sons, New York, 1906), p. 307-308.

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30. Swift, *Popular Theater and Society in Tsarist Russia* (see note 20), p. 132.

31. Pares, *Russia and Reform* (see note 25), p. 464; *Education in Italy and Russia. United States Bureau of Education, Chapters from the Report of the Commissioner of Education for 1893-94* (Government Printing Office, Washington, 1896), p. 400; Swift, *Popular Theater and Society in Tsarist Russia*, pp. 68, 133, 148.

32. Patricia Herlihy, *The Alcoholic Empire: Vodka and Politics in Late Imperial Russia* (Oxford University Press, New York, 2002), p. 20. This book gives a thorough history of the temperance movement in Russia, with a number of references to the use of magic lantern slides (pp. 20, 27, 77, 97, 121). Unfortunately, the author also give a completely inaccurate description of the magic lantern and how it works: "The magic-lantern slides, which were in black and white, were forerunners of 35-millimeter color slides and were images developed on an emulsified glass plate within the camera. To see the image, the plate was put in a lighted glass box (the lantern) and people peered through a lens at the illuminated image" (p. 168, note 26).

33. Swift, *Popular Theater and Society in Tsarist Russia* (see note 20), p. 156.

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39. Alexander Pushkin, "The Gavriliad," in: D. M. Thomas, translator, *The Bronze Horseman. Selected Poems of Alexander Pushkin* (Viking Press, New York, 1982), pp. 96-97.

40. This poem is quoted by Stephen Bottomore, A word paints a thousand pictures: the magic lantern in language and metaphor, in: Richard Crangle, Mervyn Heard, and Ine van Doren, eds., *Realms of Light: Uses and Perceptions of the Magic Lantern From the 17th to the 21st Century* (The Magic Lantern Society, London, 2005), p. 59.

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42. Henry Heiseler, *Die Magische Laterne* (Musarion-Verlag, Münich, 1919), pp. 40-66. The translations of the stage directions and dialogue from the play are my own.

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48. Thomas Seifrid, Gazing on life's page: perspectival vision in Tolstoy, *PMLA* 113 (1998), pp. 436-448. Citing a book by Donna Orwin, Seifrid states that Tolstoy also compares Prince Andre's sister Maria to a magic lantern. However, this book actually refers to an "illuminated lantern," not a magic lantern [Donna Tussing Orwin, *Tolstoy's Art and Thought, 1847-1880* (Princeton University Press, Princeton, New Jersey, 1993), p. 128]. Indeed, the original passage from *War and Peace* clearly refers to a glass lantern illuminated from within, not an image being projected by a magic lantern: "Just as the complicated, skilful, artistic work which at first had appeared coarse, dark, and senseless suddenly appears with unexpected and striking beauty on the wall of a painted and chiseled lamp, when the candle within is lighted, so was the face of Princess Márya suddenly transformed" [Count Lev N. Tolstoy, *War and Peace*, translated by Leo Weiner (J. M. Dent, London, 1904), Vol. IV, Epilogue, part 12, chapter 6, p. 30].

49. Count Tolstoi on the land question, *The Arena*, vol. 34 (1905), p. 635.

50. Count Lev N. Tolstoy, *What Shall We do Then? On the Moscow Census Collected Articles*, translated by Leo Weiner (J. M. Dent & Co., London, 1904), pp. 434-435.

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52. I have not attempted to do a thorough search for other terms related to the magic lantern in Russian literature. A search of Google Books turned up many examples of the metaphorical use of the term "phantasmagoria" in writings about Russia, but not necessarily by Russian writers. The 19th century poet Karolina Pavlova, who left Russia in 1858, composed a cycle of thirteen poems entitled *Phantasmagoria* (1856-1861), mostly consisting of descriptions of cities visited during her travels abroad. Many of the descriptions are fleeting, often switching locations abruptly, as with the changing of magic lantern slides. See: Olga Briker, The traveler-exile in Karolina Pavlova's *Phantamagoria*, in: Susanne Fusso and Alexander Lehrman, eds., *Essays on Karolina Pavlova* (Northwestern University Press, Evanston, Illinois, 2001), pp. 135-154. Several years earlier, Pavlova had entitled one of her poems "Laterna Magica" [Olga Briker, *The Poetic Personae of Karolina Pavlova* (1807-1893), Ph.D. dissertation, Columbia University, New York, 1996), p. 180].

Through Russia by sleigh. Two lantern slides from the set, *From the Thames to Siberia*. Wells collection.

Two Russian magic lantern slides (shown in color on the front and back covers). The top slide label reads: **Optics - Mechanics - O. Richter - St. Petersburg.** The bottom picture shows the reverse side of the slide, with a label that reads: **Specialty: magic lanterns, pictures, and accessories.** Wells collection.

My thanks to Peter Turchin for translating the Russian labels.

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Early Magic Lantern Illustrations: What Can They Tell Us About Magic Lantern History?

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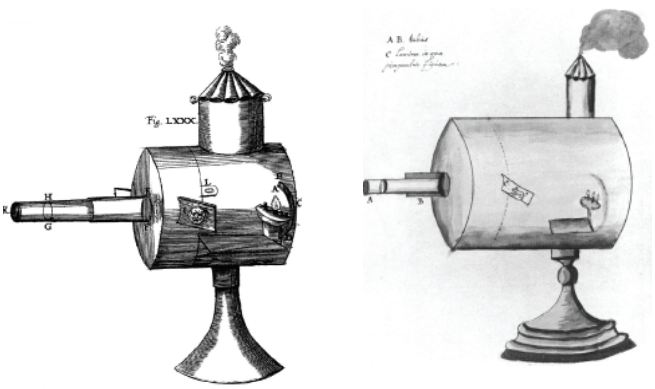
The earliest period of magic lantern history is still a bit of a mystery. Only about 28 lanterns from the first 150 years of image projection survive in museums or private collections, and the story of the discovery and dissemination of the magic lantern across Europe and the rest of the world is full of gaps.

I will use illustrations from early books on science, including optics, scientific instruments, and even magic, to search for clues about how the magic lantern travelled around Europe and what very early magic lanterns looked like. Mostly these early books have been sought after by collectors, who buy them simply because they have pictures of magic lanterns in them. Beyond this, we don't trust them very much. By the 18th century at the latest, the magic lantern had become a widespread metaphor, a symbol of enlightenment. Used in political satire, it was a scurrilous instrument used to mystify ignorant people. The magic lantern therefore became a symbol commonly used by artists, satirists, and political commentators who had little knowledge of, or interest in, the actual instrument itself. Such illustrations, except in rare cases, bear little or no resemblance to reality. In contrast, I believe that illustrations of magic lanterns in scientific works of the 17th and 18 centuries are predominantly representations of existing devices and can provide significant information about the design, evolution, and spread of the magic lantern in its early years.

Let's begin with a representation of the magic lantern made by Johann Franz Griendel in Nuremberg in 1671. Griendel is the first known maker of magic lanterns in Germany.[1] I will not go into all of the details here of how I have established that this is Griendel's lantern; that text is in my book.[2] This lantern has been known as the 1686 illustration by Johann Christoph Sturm.[3] For our purposes, we don't need to argue about this being Griendel's lantern: he and Sturm lived a few miles from each other, knew each other well, disliked each other, and circulated in the 1670s in the same social and scientific circles in Nuremberg. So this is an illustration of a southern German magic lantern from 1671. What is especially interesting about this lantern is its overall design, with a body in the form of a horizontal cylinder, held up on a raised pedestal, with the slide stage cut through the front section of the body itself.



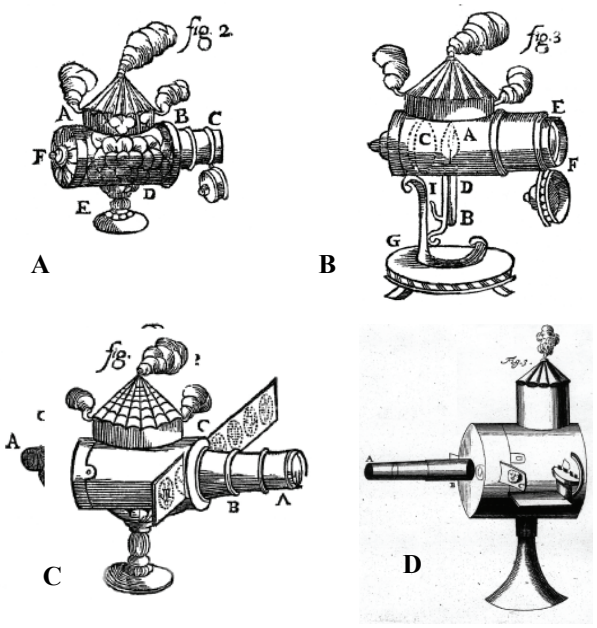
Left: Sturm's 1676 illustration of Griendel's magic lantern.

Right: Watercolor of a Griendel-style lantern from the collection of Werner Nekes.

This is a design of lantern that seems to have been commonly known in southern Germany up to about 1700 or 1710. There are several further illustrations of this type of lantern. One is a watercolour in the Werner Nekes Collection, drawn by an anonymous Dutch scientist.[4] Nekes dates this piece to around 1680, and David Robinson has commented that the artist probably had the lantern in front of him when he drew it, because of the detail of the adjustable ball-joint on the stem of the lantern's pedestal, and the placement of the chimney over the lamp. This watercolour shows all of the same design characteristics of Griendel's lantern illustrated by Sturm.

Johann Zahn also included several illustrations of this type of lantern in his *Oculus artificialis sive curiosum* (1686).[5] What is interesting about Zahn is that he called Griendel his "former teacher of practical dioptrics",[6] and he assembled his book from many other sources, primarily from across the southern part of Germany.

Stephane Chauvin also published an illustration of this Griendel-style lantern in his book, *Lexicon Rationale sive Thesaurus Philosophicus*, published in Rotterdam in 1692.[7] His French name at first glance would put him in western Europe, as would the publication of his book in Rotterdam. However, at the time he wrote and then published the book,

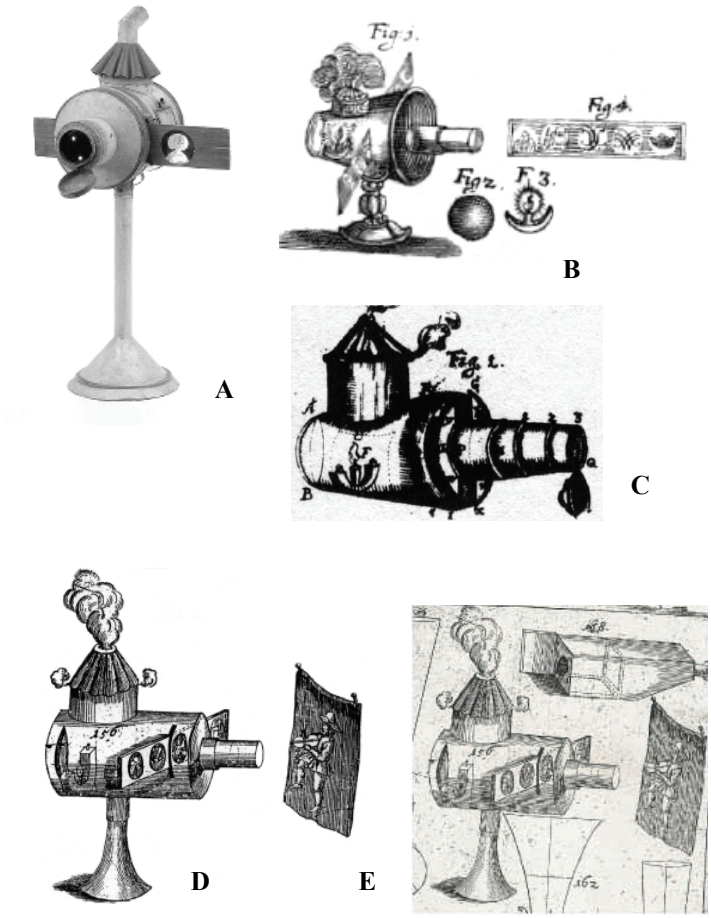


A-C: Three illustrations of Griendel-type magic lanterns by Johann Zahn (1686). **D**: Illustration of a Griendel-type lantern by Chauvin (1692).

Chauvin was a Professor in Berlin, so this lantern is neither from Rotterdam nor Paris. Indeed, he was illustrating the southern German lantern of Griendel, perhaps copied from Sturm. This illustration is repeated in the 1713 edition of his book, and that is the date assigned by *The Lantern Image* (page 17, number 24).[8] That date is deceptive, however, because the illustration was first published 21 years earlier.

One might argue that all of these images are all self-circulated ideas from various intellectuals and scientists, with little bearing on actual lantern manufacture. This position seems hard to justify, given that Sturm published accurate illustrations of several instruments that he demonstrated in a series of lectures in 1672. Indeed, there are surviving examples of 17th century lanterns with horizontal cylindrical bodies, most likely bought in 1699 in Nuremberg, while the Landgrave of Hesse was on a long, roundabout trip to Italy. They are now in his Kunstkabinett, in the state museum in Kassel. Photographs of one of these lanterns previously appeared in books by Hrabalek and Hoffman, as well as my own book.[9]

There are a few more surviving illustrations of this type of lantern, including the lantern of Matthaeus Christian Muller, in *De Laterna Magica*.[10] All of these illustrations originate in publications (or from authors) that can be located in southern Germany, and are all from before 1710, when this style of lantern seems to have ceased production. Another similar illustration is the lantern of Samuel Joannes Rhaenus, from *Novum et Curiosum Laternae Magicae Augmentum*.[11]



A: Griendel magic lantern, currently in the State Museum in Kassel. **B**: Illustration of Griendel-type lantern by Muller (1704). **C**: Illustration of Griendel-type lantern by Rhaenus (1713). **D**: Illustration of Griendel-type lantern by Schmidt (c. 1700). **E**. Illustration copied from Schmidt by Bytemeister (1739).

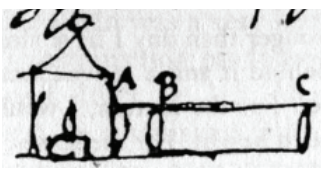
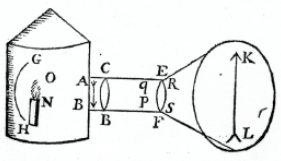
Another illustration that is well-known, since it is in *The Lantern Image* on page 16, number 18, is given the proper date of c. 1690. This illustration comes from a book by Johan Andreas Schmidt published in 1727 in Helmstedt, *Collegii Experimentalis physico-mathematici Demonstrationes*.[12] The trouble is that the British Library's copy is the fifth edition. So 1727 is not the proper date for this lantern, and the illustration clearly dates from much earlier. I have tracked the third edition of this book, which is considered to be "c. 1700",[13] which sounds right to me. This would put a first edition, so far not known to have survived, in the 1690s or a bit earlier. This is the date assigned by *The Lantern Image* and is the essential period for this style of lantern. Tracing this book and its missing first edition is a reminder that Zahn most likely used illustrations from a variety of contemporary publications from the 1670s and 1680s in his *Oculus Artificialis*, surveying books or dissertations that no

longer exist. Presumably, the lanterns that he illustrated were all extant variations of magic lanterns manufactured at the time in southern Germany.

This brings up one of the tricky elements of working with old illustrations: Be certain of your editions, not just your current date of publication. Schmidt does not illustrate a 1727 lantern. By that time, the horizontal cylindrical bodied lantern most likely was no longer being made. Schmidt's illustration turns up again in a dissertation supervised by Heinrich Johann Bytemeister in 1739, *Pentas Dissertationum epistolicarum et Programmatum Academicorum*,[14] which is very late but not so unusual given that Schmidt's original publication went through at least five printings (editions) through at least 1727.

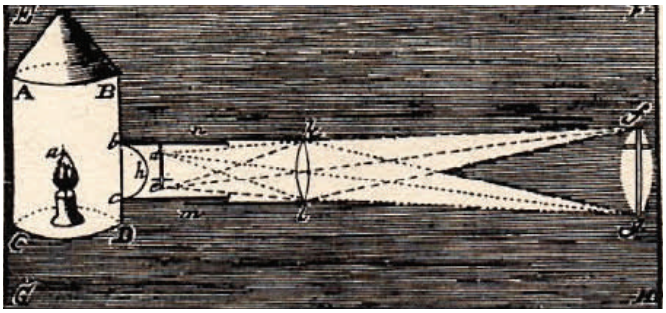
In summary, all of the known illustrations of magic lanterns with horizontal, cylindrical bodies on pedestals are from about 1670 to 1700. All of the illustrations were published in or near Nuremberg and Regensburg, two of the towns identified by Johann Zahn in 1686 as centers of magic lantern production. In fact, most of these books were published within about 60 miles of each other; one was published about 140 miles away, but still in the southern part of Germany; and one was published about 180 miles away in Berlin. So there is a particular style, a specific geography, and a limited period of time connected to this type of magic lantern. Indeed, there is no illustration at all of any rectangular-bodied or square-bodied lantern sitting on its own base or its own feet until 1693, and this type of rectangular lantern was not commonly illustrated until after 1710. Further, the "missing" first two editions of Schmidt, plus the variety of lanterns illustrated by Zahn, give clear evidence that there were published illustrations of the magic lantern in or before the 1680s which no longer survive, or which have not been seen by magic lantern historians. This suggests that the early history of the magic lantern is incomplete, possibly disastrously so.

I suggest that our present-day history of how the magic lantern was invented, and how it moved around Europe, which involves Christiaan Huygens, Thomas Walgensten, and Richard Reeve, is a very limited history that tells only a part of the story. It appears that the Huygens lantern, and certainly the lantern of Walgensten, had vertical cylindrical bodies. This is evident in the 1664 drawing of Walgensten's lantern by Pierre Petit in Paris.[15] Claude Francois Milliet Deschales's illustration of Walgensten's lantern, a decade later in 1674, is very similar to Petit's drawing.[16]

Left: Petit's drawing of Walgensten's magic lantern (1664).
Right: Deschales's illustration of Walgensten's lantern (1674).

At the end of the century, William Molyneux illustrated the same design of lantern in his *Dioptrica Nova* published in London.[17] What is particularly interesting about Molyneux's lantern is that we know that he was the owner of a magic lantern at the time he wrote his book. When he sold many of his instruments in 1694, the magic lantern was one of the few instruments he kept, along with his telescope lenses, prisms, micrometers, and pendulum clocks.[18] So it is safe to assume that Molyneux's illustration again shows an actual lantern. Most of his instruments and optics had been bought in London, and here again we can see the continued tradition of the Huygens/Walgensten design, most likely supported by Richard Reeve, Christopher Cock, and the other London instrument makers of the day.[19]



William Molyneaux's illustration of a Walgensten-type lantern (1692).

I believe it is the longevity of Molyneux's illustration, which was re-engraved and republished in numerous books for nearly 200 years, which obscured the fact that his own illustration was taken from an existing instrument. Across the decades, the diagramatically simplified and familiar lantern of Molyneux became a generalized optical sketch instead of the representation of an object, much same way that the words "xerox" and "celluloid" over time ceased to refer to specific trademarked manufactures and became labels for a class of products.

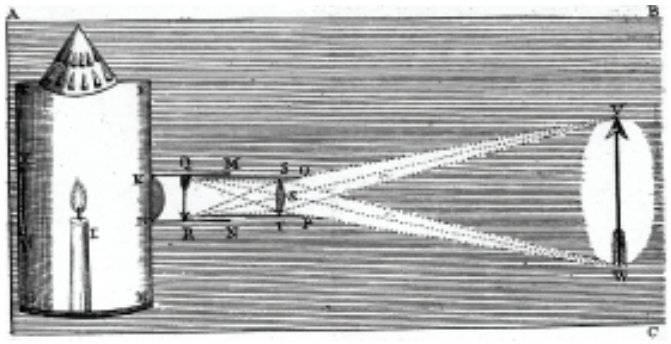


Illustration by Benjamin Martin (1740), after Molyneaux.[20]

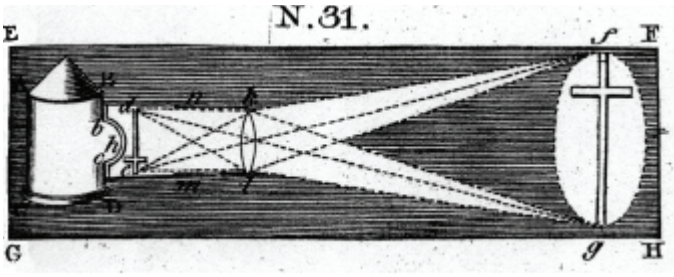
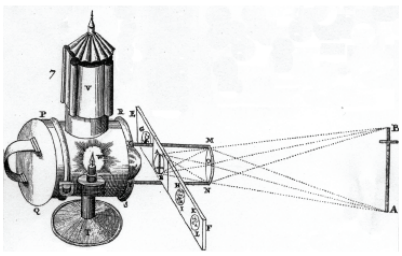


Illustration of a magic lantern from the *Encylcopedia Britannica* (1771), after Molyneaux.[21]

Looking at these two "chapters" of magic lantern design, the southern German one, which begins at the latest in 1671 with Johann Franz Griendel,[22] and the western European one, which begins in the mid-1660s with Christiaan Huygens and Thomas Walgensten, it seems that there are two quite separate magic lantern traditions. Without trying to invoke the modern scholar's penchant for definitively naming the "inventor" of the magic lantern and assessing chronological priority, perhaps Johann Christoph Kohlhans was in the end not too inaccurate to have called Griendel the "inventor" of the magic lantern.[23] At the very least we need to integrate the southern German traditions into our ongoing narrative of the early history of the magic lantern in western Europe, and to look more closely at just how these two different traditions were, in the end, melded into the mature form of the magic lantern.

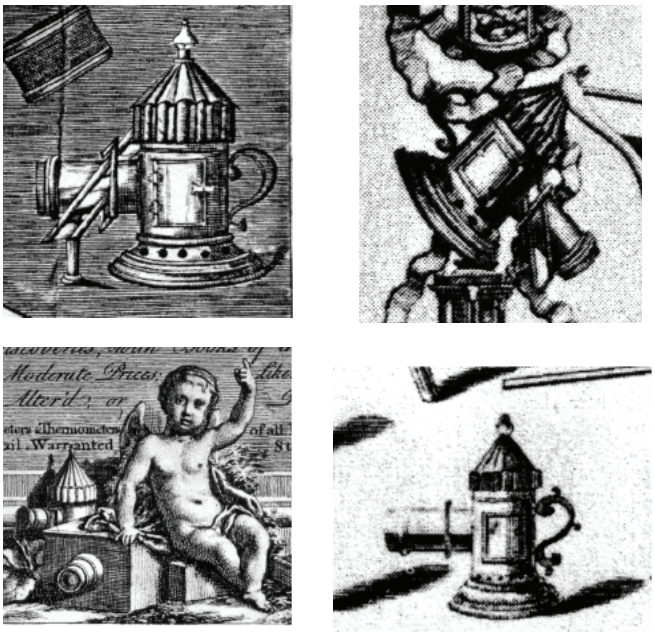
One possible moment of integration can be seen in the only horizontal cylinder lantern illustrated outside of southern Germany, made by the London instrument maker Francis Hauksbee (The Younger), in about 1714.[24] His lantern, in my opinion, is quite strange, and shows characteristics of both the south German and later London schools of lantern making. It has the horizontal cylinder body and raised pedestal from southern Germany, but a strong vertical cylinder chimney that is reminiscent of the western European tradition, which from around 1725 onwards would characterize lanterns made or sold in London by every known instrument maker. This lantern illustration of Hauksbee is a combination of design influences, and indicates that Hauksbee had some unspecified connection to southern German intellectual traditions. Either he saw this design in German publications, or examined lanterns from this area, just as he also saw the vertical lanterns that were emerging in London as the standard local design. There is much further research to be done here.



◄ Magic lantern of Francis Hauksbee (c. 1714).

I think that there is no doubt that Molyneux's lantern illustration is derived directly from the instrument that was at hand in his own collection. This lantern is a continuation of the Huygens/Walgensten lantern design, and a direct predecessor of the lanterns about to be made by several London instrument makers from the first quarter of the 18th century onwards.

The Scarlett lantern illustrated here, from his trade card in the Science Museum, London, from about 1725,[25] not only is a continuation of the western European lantern-making tradition of the 17th century, but also is the first representation of a London lantern design that dominated magic lantern manufacture during the golden age of the London scientific instrument makers. So far as I can tell, in stark contrast to the quite varied designs of microscopes, telescopes, and other optical instruments made in London, there were no other designs of magic lantern produced in London during the first half of the 18th century, when the city was the world center for scientific instrument making. We see this same style of lantern illustrated by several different instrument makers and optical instrument shops which were not associated by trade relationships or by apprenticeships.[26] These illustrations include the trade card of Dudley Adams, showing instruments of about 1734, in use when his father George Adams established the business (this card itself is from about 1800); the trade card of John Bennet, c. 1743, with the same lantern half-hidden behind a camera obscura; and the trade card of Nathaniel Hill, c. 1746, again showing the same magic lantern.

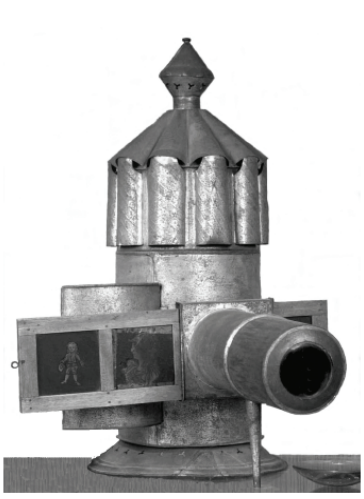


Magic lantern illustrations from London trade cards. **Upper left:** Edward Scarlett (c. 1725). **Upper right:** Dudley Adams (c. 1734). **Lower left:** John Bennet (c. 1743). **Lower right:** Nathaniel Hill (c. 1746).

This is the only style of lantern that is illustrated in London during the period,[27] and, along with the evidence of some surviving instrument maker's inventory lists, I am persuaded that there was only a single magic lantern maker supplying all of the London instrument shops during this period. This kind of secondary, supporting manufacture or "outsourcing" of supply was not unknown in the instrument trade at the time, although surviving evidence is scant and little historical work has been done in this area. I have written about this in detail elsewhere.[28] At the moment, let me just say again that all of these illustrations refer to actual lanterns. Surprisingly, only two or three of these instruments survive; 'surprisingly' because of the central position of London instrument makers in supplying their products to institutions and significant cabinets across all of Europe. There have been many international survivals of London-made scientific instruments, but very few magic lanterns are among them. One existing lantern is in the Museum Gustavianum in Stockholm. It was bought in London for £1 10*s* in 1739. The other is a very early form of the same lantern in a private collection; a third is at the university in Aberdeen. Together, these comprise the only surviving magic lanterns made by early 18th century London instrument makers.

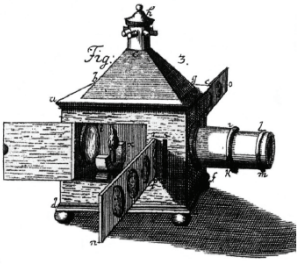
The Stockholm lantern actually is the only existing example of a London-made lantern in its mature form. The Hauksbee magic lantern seems to be a late hybrid design that combines some elements of the southern German lantern and some prototypical elements of the later London lantern. The two other surviving lanterns, which I would date to around the same period, c. 1714, are reminiscent of the Hauksbee lantern. However that design arrived in London, from books, from an instrument, or from travel by the instrument maker, these lanterns represent a genuine step towards the slightly later London lantern. In their vertical cylindrical bodies and corrugated staged chimneys, they are definitely London products; this design of lantern was made nowhere else. At the same time, the pedestals are unique, and seem to be left over from the southern German lantern, or at least from Hauksbee, or possibly from something Hauksbee once saw. It would be most interesting to know who made these lanterns, and precisely when they were made.

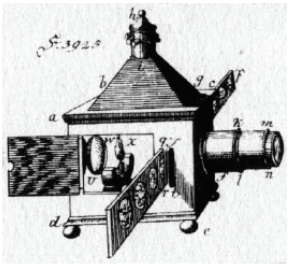
I believe that there are a few additional surviving lanterns that verify the accuracy and authenticity of lantern illustrations in early scientific books. The issue here is not whether the book design preceded the lantern, or vice-versa. While that would be most interesting to know, albeit virtually impossible to discover, I think it is more important to take notice of some unusual design elements that appear in both scientific illustrations and surviving lanterns. These elements provide further evidence that scientific writers and illustrators were working with actual lanterns, or perhaps in some cases, influenced lantern makers themselves. For example, there is the magic lantern illustrated by Christian Gottlieb Hertel in 1716, in his book about lens-grinding.[29] This is a rectangular or square-bodied lantern, one of the very first illustrated, and it already declares



Left: London-type magic lantern, now in the Museum Gustavianum in Stockholm. **Right:** London-type lantern, perhaps an earlier model, from the Richard Balzer collection.

the death of the horizontal cylinder lantern. It also suggests the move of lantern manufacture away from Nuremberg and Regensburg, where metalworkers who could work in curved forms were commonly available. First, notice the unusual chimney vents, a ring of small tubes jutting out perpendicular to the chimney around its top and just under its conical peak. Second, notice a survival from the horizontal cylinder lantern, where the slide stage is cut through the body of the lantern itself. The lantern also sits on four small button feet. This lantern also has another notable oddity, a second "slide stage" cut just in front of the first one, which Hertel suggests can be used with a black slide to make the room completely dark.





Illustrations of square-bodied magic lanterns by Christian Gottlieb Hertel (1716) (left) and Johann Georg Krünitz (1794) (after Hertel) (right).

This lantern also was illustrated by Johann Georg Krünitz in his *Oekonomische Encyklopaedie*, a massive 262-volume compendium of Enlightenment knowledge.[30] The magic lantern is discussed in Vol. 65 of this encyclopaedia, published in 1794. Krünitz illustrated a dozen lanterns, giving the characteristics and advantages of each one, from Griendel's lantern of 1676

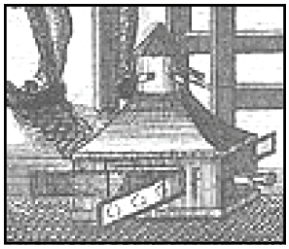
through those of Conradi (1710), Hertel (1716), and others. Because this book is such a collector's item, and still frequently available on the market, its illustrations have often been republished, sometimes with the caption "Krünitz, 1794." This gives a deceptive idea of when and where these lanterns were first designed and used. Some authors have used the easily-available Krünitz illustrations, but have given the original publication date and author. Even this gives a slightly false idea of the lantern design itself, since the re-engravings of the original illustrations in Krünitz are always slightly different from the originals. Krünitz is only Krünitz, and should not be allowed to muddy the waters of historical investigation.

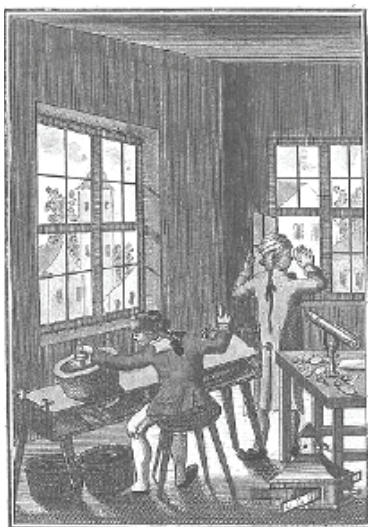
A spectacular magic lantern in the collection of the Swedish Academy of Sciences in Stockholm was made by the Berlin instrument maker Koch about 1740 or 1750, beautifully produced in an olive wood veneer case, with a brass chimney. Note the button feet, the slide stage cut through the body of the lantern, and particularly the small perpendicular tubes serving as chimney vents at the top under the peak. From the angle of the photograph, we cannot tell if it has the double slide stage, but the slide present in the image is in a stage that is far enough back from the front of the body to accommodate a second slot, as in Hertel's lantern.

Square-bodied wooden magic lantern in the collection of the Swedish Academy of Sciences.

One further illustration of this lantern of Hertel comes from a hand-coloured engraving of a lens-grinder's workshop, dating from about 1790. The print is by Jacob Georg Schrazenstaller (1767 - 1795), and is titled *Der Glassschleifer* (the Lens-Grinder). A detail of the lantern shows a design clearly related to Hertel, as can be easily seen from the perpendicular chimney tubes and the two slide stages. Given the print's subject of lens-making, it is perhaps not unusual that the Hertel lantern has persisted until the end of the century. But it is interesting to see the graphic representations of such an unusual lantern bracketing a surviving example.

Another interesting correspondence between a surviving lantern and an early illustration is the famous late-17th century lantern from Turin,[31] and the illustration in M. L. L. De Vallemont's *La physique Occulte* of 1693.[32] These lanterns are

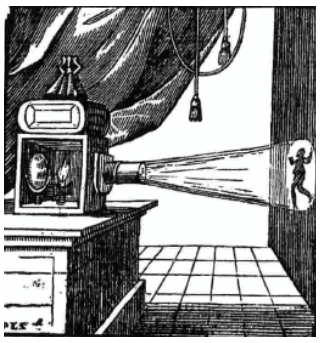


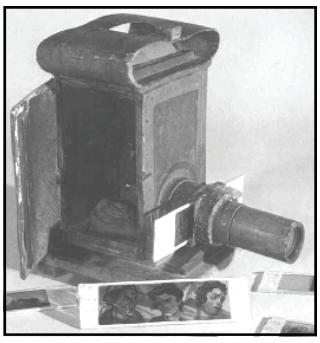


Right: Engraving of a lens-grinder's workshop (c. 1790), by Jacob Georg Schrazenstaller.

Above: Detail showing the magic lantern.

not precisely and fully the same. However, the Turin lantern is the only known example of a lantern with this odd curved roof layer over its lamphouse and under its (missing) chimney, and the Vallemont illustration is the only known example of a lantern engraving with a very similar roof layer. Vallemont's illustration is also the very first appearance of a lantern with a rectangular body sitting on its own base. There was not another rectangular lantern illustration published until 1715.[33]



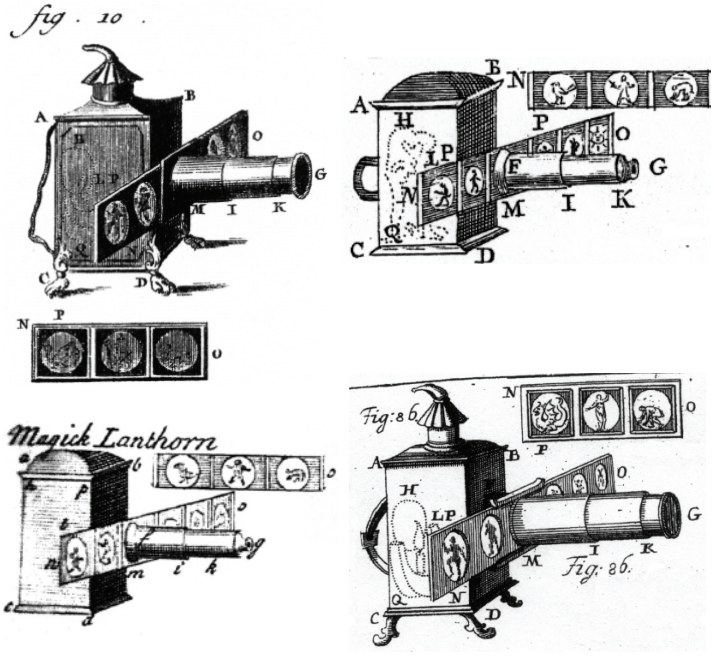


Left: De Vallemont's 1693 illustration of a magic lantern.

Right: A similar magic lantern in the Museo Nazionale del Cinema, Turin, Italy

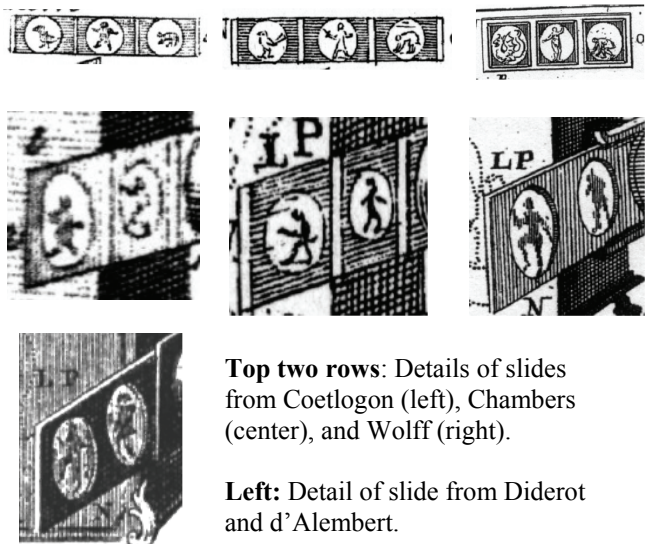
If we accept the thesis that early magic lantern illustrations in scientific books were predominantly based on actual lantern-making practice, and on actual examples of lanterns seen by the engravers or authors of those works, what can we learn about the history of the magic lantern? For one thing, we learn to watch carefully for the initial appearance of an illustration. For example, take the well-known illustration from the *Encyclopedie* of Denis Diderot and Jean le Rond d'Alembert, published in Paris in 1751.[34] One might think that this illustration depicts a mid-18th century French lantern, representing French construction practises, with its relatively delicate and ornamental feet. However, if you knew that this

lantern illustration was a re-engraved copy of some images in British encyclopaedias of the 1740s, then you might think that it was just a mid-century generic symbol of a magic lantern, not particularly attached to any actual lantern or specific place. Indeed, Diderot's lantern appeared in Ephraim Chambers's *Cyclopaedia: or, an Universal Dictionary of Arts and Sciences*, published in London in 1738 (I use here the second edition).[35] It is perhaps not so surprising that Diderot and d'Alembert took over this illustration, as the project for their *Encyclopédie* began as a commission from a Paris publisher to translate Chambers's work. Then it quickly expanded into an original and much larger project, but much of Chambers survives across the entire French publication. The same lantern also appeared in Dennis de Coetlogon's *An Universal History of Arts and Sciences*, published a few years later in London.[36] Coetlogon clearly had re-engraved the lantern from Chambers, and Diderot and d'Alembert copied it from one or both British authors.



Upper left: Engraving of a magic lantern from Diderot and d'Alembert (1751). **Upper right:** Engraving from Chambers (1738). **Lower left:** Engraving from Coetlogon (1745). **Lower right:** Engraving from Wolff (1715).

The intriguing problem is that we have already learned that in the 1730s and 1740s, no square-bodied lanterns of this type were being made or offered for sale in London. So where did Chambers and de Coetlogon come up with this design for their encyclopaedias? The source appears to be a lantern first illustrated in a dictionary, *Elementa Mathesos Universae*, by Christian Friedrich Wolff in Berlin in 1715.[37] We know that Wolff is the source for both British publications, because, although the re-engravings have been done rather hastily, and lose some of Wolff's detail in the lantern, the accompanying slide shows the figures of a bird (derived from Wolff's dragon), a man with his arms outstretched, and a crouching man, and is the same in all three versions of this illustration. So what we actually have in Diderot's magic lantern is not a representation of French lantern making in the middle of the 18th century, but rather an example of northern German lantern design from the very early years of the 18th century. At that period, the rectangular or square-bodied lantern was something of a novelty, the latest new design for an instrument that had been known for half a century in horizontal cylindrical form.

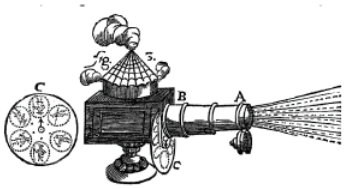


Top two rows: Details of slides from Coetlogon (left), Chambers (center), and Wolff (right).

Left: Detail of slide from Diderot and d'Alembert.

Again, it is Krunitz who muddies the waters by reprinting Wolff's lantern, even though properly cited, in 1794, long after the first published version of the illustration, and well after Chambers, de Coetlogon, and Diderot. Krünitz again gives a misleading impression of longevity for the design, and contributes to the false idea that scientific illustrations of magic lanterns were just types, and not based on existing lanterns.

Several years ago, one writer dismissed the dozen variant lantern designs that Johann Zahn published in 1686 as nothing more than imaginative fantasies. In particular, his most famous lantern, the one with circular slides that has been used by many historians to suggest an early attempt at moving pictures, was considered by this writer to be proof of Zahn's imaginative relationship to the exciting new field of practical dioptrics. I am convinced that Zahn was publishing images of lanterns which he had seen himself, or which had been seen by others and were illustrated in their now-lost publications. Indeed, there is a surviving magic lantern, very much like Zahn's illustration, complete with a holder for a circular slide, which is in Kassel.



Top: Zahn engraving of a magic lantern with a circular slide.

Right: Magic lantern for circular slides in the State Museum in Kassel.

Notes and References

1. See F. Paul Liesegang, "Die älteste Nachrichten über die Zauberlaterne aus Deutschland", in: *Central-Zeitung für Optik und Mechanik*, Jg. 1919, Nr. 8 & 9. For additional material on Griendel that supplements this essential article with modern research, see Deac Rossell, *Laterna Magica – Magic Lantern*, Vol. 1 (Stuttgart, 2008: Füsslin Verlag), pp. 25-34.

2. Deac Rossell, *Laterna Magica - Magic Lantern, Eine Geschichte - A History, Band 1 - Volume 1* (Stuttgart, 2008: Füsslin Verlag).

3. Johann Christoph Sturm, *Collegium experimentale sive curiosum* (Nürnberg, 1676), Fig. LXXX, p. 164.

4. Illustrated in Bodo von Dewitz and Werner Nekes, *Ich sehe was, was du nicht siehst! Sehmaschinen und Bilderwelten. Dies Sammlung Werner Nekes* (Köln, 2002: Museum Ludwig (Agfa-Foto-Historama)/Steidel), p. 115.

5. Johann Zahn, *Oculus artificialis sive curiosum* (Herbipoli [=Würzburg], 1785/86), Vol. 3 (1686), Figs 2-4, p. 251 & Fig. 1, p. 253. Additional lanterns appear in both pages, and in Vol. 3 (1686), Pl. XVII, Fig. 6 & 7.

6. Zahn, *op. cit.*, Vol. 3, p. 234.

7. Stephané Chauvan, *Lexicon Rationale sive Thesaurus Philosophicus* (Rotterdam, 1692), Tab. XVIII, Fig. 3. The same image was included in the 1713 edition.

8. David Robinson, *The Lantern Image* (London, 1993: The Magic Lantern Society). There are also two supplements to this book, also compiled by David Robinson: *Supplement No. 1* (1997) and *Supplement No. 2* (2009)

9. Ernst Hrabalek, *Laterna Magica, Zauberwelt und Faszination des optischen Spielzeugs* (Munich, 1985: Keyser), p. 47; Detlev Hoffmann and Almut Junker, *Laterna Magica, Lichtbilder aus Menschenwelt und Götterwelt* (Berlin, 1982: Frölich & Kaufmann), p. 36. There are actually three lanterns of this form and date in the collection in Kassel.

10. Matthaeus Christianus Müller, *De Laterna Magica* (Jena, 1704), Fig. 1.

11. Samuel Joannes Rhaenus, *Novum et Curiosum Laternae Magicae Augmentum* (1713), Fig. 1.

12. Johann Andreas Schmidt, *Collegii Experimentalis physico-mathematicii Demonstrationes* (5th edition; Helmstedt, 1727), Tab. X, fig. 156.

13. See *Das Verzeichnis der in Deutschen Sprachraum erschienen Drucke des 17. Jahrhunderts* (at http://www.vd17.de) for VD17 3:609782Q, copy in the Universitäts- und Landesbibliothek Sachsen-Anhalt, Halle, Signatur Gb 1281.

14. Heinrich Johann Bytemeister, *Pentas Dissertationum Epistolicarum et programmatum Academicorum* (Helmstedt, 1739). This illustration is clearly re-engraved after Schmidt: note the identical slide being projected. Interestingly, the illustration is carried to this late date not only by the several continuing editions of Schmidt, but also through a differently designed lantern with a square body illustrated in an immediately previous publication by Bytemeister, again using the same slide illustration. See his *Bibliothecae appendix sive catalogus Apparatus Curiosorum* (2nd Edition; Helmstedt, 1735), Tab,. III, Fig. LXXIV.

15. Pierre Petit, letter of 28.11.1664 to Christiaan Huygens, in: Huygens, *Oeuvres*, Vol. 4, p. 269, Letter No. 2078.

16. Claude François Milliet Dechales, *Cursus sens Mundus Mathematicus* (Lyon, 1674), Vol. 2, p. 666.

17. William Molyneux, *Dioptrica Nova. A Treatise on Dioptricks, in Two Parts....* (London, 1692), Pl. 38, Fig. 2.

18. See K. Theodore Hoppen, *The Common Scientist in the Seventeenth Century; a study of the Dublin Philosophical Society 1683-1708* (Charlottesville, VA, 1970), p. 94. Molyneux's apparent fondness for his magic lantern seems odd, in light of his often-repeated comments that lantern images were "usually some Ludicrous or frightful Representation, the more to divert the Spectators." See *Dioptrica Nova* (Note 14), p. 183-4.

19. For further details, see Deac Rossell, "Early Magic Lantern Makers", forthcoming.

20. Benjamin Martin, *A New and Compendious System of Optics* (London, 1740), Plate XXXIV, p. 294.

21. *Encyclopaedia Britannica* (Edinburgh, 1771), First Edition, Vol. III, Plate CXL, Opticks. This illustration was repeated in the 2nd edition (1780, Vol. 6, Plate CCXVI, Optics, fig. 5). It was also repeated by Joseph Priestley, *The History and Present State...of Vision, Light, and Colours* (London, 1772), Plate VII, fig. 48, and since Priestley uses the same "slide image" of a cross, rather than Martin's arrow, it is likely he copied the Britannica plate.

22. Griendel is a bit of a mystery and another good subject for further research. His optical involvements are known from the time of his arrival in Nuremberg in 1671, and it has not yet been determined whether he brought the design of the magic lantern (and other instruments) with him to Nuremberg, or whether he found local craftsmen making the magic lantern and then represented their work for sale outside the city. Prior to his 1671 arrival he had spent almost a year in Regensburg, after leaving the Capucin order of monks for whom he served in Salzburg, Munich, Kitzingen, and Würtzburg.

23. Johann Christoph Kohlhans, *Neu-erfundene Mathematische und Optische Kuriositäten* (Leipzig, 1677), p. 318. Describing an "Optical Lantern with which every kind of painting can be represented either small or large to the eyes in a darkened room", Kohlhans says: "One such lantern was invented by Herr Johann Franz Gründel von Ach auf Wanckhausen, a leading optician in Nürnberg."

24. Francis Hauksbee and William Wriston, *A Course of Mechanical, Optical, Hydrostatical and Pneumatical Experiments* (London, c. 1714), p. 10, Fig. 7 (numbering varies in different copies).

25. For specific information on this trade card and others noted in this article, see M. A. Crawforth, "Evidence from Trade Cards for the Scientific Instrument Industry", in: *Annals of Science*, 42 (1985), 453-554. See also H. R. Calvert, *Scientific Trade Cards in the Science Museum Collection* (London, 1971: Her Majesty's Stationery Office [Science Museum London]).

26. See Gloria Clifton, *Directory of British Scientific Instrument Makers 1550-1851* (London, 1995: Zwemmer, in association with the National Maritime Museum).

28. Perhaps it should be noted here that other instruments illustrated on these trade cards establish that their illustrations, including this magic lantern, were not copied by engravers from the Scarlett card.

29. Principally in an unpublished address to the Annual General Meeting of the Scientific Instrument Society, Society of Antiquaries, Burlington House, London, on July 10, 2002. A full article on this topic will be forthcoming.

30. Christian Gottlieb Hertel, *Vollständiige Anweisung zum Glaß-Schleiffen* (Halle I. M., 1716), Tab XV.

31. Johann Georg Krünitz, *Oekonomisch-technologische Encyclopädie, oder allgemeines System der Staats-Stadt-Haus-und Land-Wirtschaft, und der Kunst-Geschichte, in alphabetischer Ordnung* (Brünn, 1787 - 1858), Vol. 65 (1794), Pl. LXV, Fig. 3925.

32. This lantern is at the Museo Nazionale del Cinema, Turin, where it has been in the collection for many years. It was found in Venice.

33. M. L. L. De Vallemont, *La Physique occulte, ou Traité de la baguette divinatoire,...* (Paris, 1693), p. 404.

34. Note also that the Vallemont illustration is re-engraved in other editions of this work, even in the Amsterdam edition also published in 1693. The changes are mostly to the drapery and not to the lantern. Johannes Zahn published two illustrations of lanterns with rectangular—instead of horizontal cylindrical—bodies in 1686, but both are raised on conical bases with tubular stems in the manner of the cylindrical southern German lantern. See Zahn (*op. cit.* [note 4], Vol. 3, p. 253, figs. 2 & 3.

35. Denis Diderot and Jean le Rond d'Alembert, *Encyclopédie* (Paris, 1751-1772).

36. E. Chambers, *Cyclopaedia: or, an Universal Dictionary of Arts and Sciences...* (2nd Edition; London, 1738), Vol. 2, Tab. Opticks, Fig. 10.

37. Denis de Coetlogon, *An Universal History of Arts and Sciences* (London, 1745), Plate: Opticks, *Magick Lanthorn*. Note that the "Fig. 17" seen in some reproductions, including *The Lantern Image* 35, p. 19, belongs to an adjacent microscope in a very crowded plate.

38. Christian Friedrich Wolff, *Elementa mathesos universae* (Berlin, 1713-15), Vol. 2 (1715), fig. Dioptricks, Tab XI, fig 86.

Northeastern Magic Lantern Group Meeting

In May, Dick Balzer hosted a wonderful meeting of the Northeastern Group of the Magic Lantern Society at his home in Brookline, Masschusetts. There were a number of interesting shows and presentations, including a comparative show of many different versions of the "ratcatcher" motion slide. The real treat, however, was the opportunity to see Dick's extraordinary collection, recently installed in a large carriage house magic lantern museum behind his home. His collection includes not only some of the rarest of all magic lanterns, but also an enormous array of slides and printed material, including books, pamphlet, catalogs, broadsides, antique prints, and advertising cards with a magic lantern theme. Also on display were some of his "side collections," including an extraordinary group of antique jack-in-the-box figures, lithopanes, toy shadow plays, toy moving panoramas, zoetropes, praxinoscopes, and a host of other wonderful optical toys.

The wall of toy magic lanterns, representing a small portion of the Balzer collection. Photos by K. D. Wells.

Four very rare German and French toy magic lanterns.

Dick Balzer gives a guided tour of his collection while Karl Link looks on.

A small part of Dick Balzer's collection of porcelain figurines showing traveling magic lantern showmen.

Front Cover: Russian-made lantern slide of the monument to Tsar Nicholas I in St. Isaac's Square, St. Petersburg, Russia. The statue was unveiled in 1859 and was a technical wonder of its time. It was the first equestrian statue in the world with only two support points (the rear hoofs of the horse). The pedestal stands on a platform made of red Finnish granite, while the lower part of the pedestal is of dark gray granite and red porphyry. The middle part is made from a block of red Finnish granite and is decorated with bronze bas-reliefs. The upper part of the pedestal is made of red porphyry, while the pedestal of the horse statue is made of white Italian marble. Wells collection.

Back Cover: Russian-made lantern slide of the Nicholas Bridge, the first permanent bridge across the Neva River in St. Petersburg, Russia. It was built in 1843-1850 and was designed by Stanisław Kierbedź, a Polish engineer working in Russia . The bridge was made of cast iron, and at the time, it was the longest bridge in Europe and the first large bascule bridge in the world. Originally called the Nevsky Bridge, and later the Blagoveshchensky (Annunciation) Bridge, it was renamed the Nikolaevsky (Nicholas) Bridge in 1855 as a memorial to Tsar Nicholas I. The gold-roofed structure on the left is a shrine to St. Nicholas. The bridge was renamed again as the Lieutenant Schmidt Bridge from 1918 to 2006. The original bridge underwent major alterations and reconstruction from 1936 to 1938, with the cast iron structure being replaced by longer steel spans. It was dismantled in 2006 and replaced by a new, wider Blagoveshchensky Bridge. Wells collection.

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